

Health and Flood: Hidden Dangers and Challenges of Flood Disaster**KhinThandarAung^{1*}, Mohd Said Nurumal², Nurul'AinAhayalimudin³, Nurul 'Inayati Abdul Rahman³**¹Lecturer/ Head Critical Care Nursing Department, Faculty of Nursing International Islamic University, Malaysia²Dean, Faculty of Nursing International Islamic University, Malaysia³Lecturer, Critical Care Nursing Department Faculty of Nursing International Islamic University, Malaysia**Review Article*****Corresponding author**
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Abstract: Floods are the most common natural disaster and the highest fatality rate among the natural disaster around the world. The health impacts of floods are wide ranging, and depend on many factors. The physical and mental health may be affected during and after flooding. With that, it is important to be aware that the impact on health due to floods and there is needed to implement a comprehensive management in preparedness, response and recovery phase of flood disaster management to reduce the adverse effects of floods as well as for the effectiveness of public health intervention. The purpose of this paper was to illustrate the health impacts of floods and to explore the hidden dangers and challenges during and aftermath of flood disaster. The reviewed literature for this paper was based on the related data sources of floods, flooding, disasters, extreme events, health impacts, floods and health, health impacts of flood in PubMed, Google scholar and research gate within fifteen years. In this paper, the health impacts due to flooding from different dimensions such as impacts of physical health and mental health have been discussed and then explored the hidden dangers and challenges during and aftermath of the flood disaster. During the flood and its aftermath, there are also threats to an individual's health and safety. It is strongly suggested that enhanced public health planning and interventions could focus on the precise practices and mechanisms that intersect to produce anxiety, stress, and their amelioration at individual and community levels.

Keywords: Flood, Health Impacts, Physical health, mental health, Hidden dangers, Challenges.

INTRODUCTION

Floods are the most common natural disaster and the leading cause of natural disaster deaths in the worldwide and were responsible for 6.8 million deaths in the 20th century. Asia is the most flood-affected region, accounting for nearly 50% of flood-related fatalities in the last quarter of the 20th century [3]. The impacts of human health and its consequences due to flooding are complex, far-reaching and difficult to attribute to the flood event itself. There is very limited evidence of the health impacts of floods. The immediate risks of trauma and death are generally clear, but it seems that long-term impacts, especially in mental health, are often underestimated and probably receive too little attention from public health authorities. The main health impacts of flood are deaths, injuries and mental health illnesses during the flood event itself, during the restoration process, or from knock-on effects brought about by damage to major infrastructure including displacement of populations. Increased rates of diarrhoea (including cholera and dysentery), respiratory infections, hepatitis A and E, typhoid fever, leptospirosis, and vector-borne diseases have been

described as occurring after floods in developing areas. Malnutrition caused by inadequate food supplies and problems with distribution compounds the effects of disease. Therefore, the interactions between flood events, their aftermath, and recovery leading to health and wellbeing outcomes for individuals are complex. Moreover, the pathways and mechanisms through which wellbeing is affected are often hidden and remain under-researched. For these reasons, it is needed to explore the health impacts of flood thoroughly.

DISCUSSION**What are the health impacts in Floods?**

Floods may affect human health through either directly or indirectly, resulting in various health impacts whose magnitude, at the population level, will depend on the characteristics of the floods as well as on the environmental, economic, and social contexts of the areas in which these floods occur. Health impacts can occur directly through contact with floodwaters or indirectly from damage due to infrastructure, ecosystems, food and water supplies or social support

systems. They can be immediate or can appear days, weeks or months after the floods have receded.

In the immediate term of flood, the health impacts due to flooding include drowning, injuries, hypothermia, and animal bites. Moreover, some of the health risks are also associated with the evacuation of clients, loss of health workers, and loss of health infrastructure including essential drugs and supplies. The infected wounds, complications of injury, poisoning, poor mental health, communicable diseases, and starvation are indirect effects in the medium-term of flooding. In the long-term, chronic disease, disability, poor mental health, and poverty-related diseases including malnutrition are the potential legacy.

Impacts on Physical Health

The impacts on physical health of people who are exposed to flood water include drowning from walking or driving through flood water, diarrhoeal, vector- and rodent-borne diseases, respiratory, skin and eye infections, chemical poisoning contamination, including carbon monoxide poisoning from generators used for pumping and dehumidifying. Sprains, strains, lacerations, abrasions and contusions are the most commonly reported injuries following floods.

Impacts on Mental health

Flooding can affect the social and mental health that may continue over extended periods of time. People's psychosocial needs, and the mental disorders that they might develop because of their being flooded, pose core challenges for the community, public health, primary care and specialist mental healthcare services. Flooding can challenge the psychosocial resilience of the hardest of people who are affected. Flooding is very stressful and that the stress continues for a long time after the water has receded.

Flooding affects people of all ages and it can indicate bereavement, economic problems for families, behavioural problems in children, increased substance abuse, increased domestic violence, as well as exacerbating, precipitating or provoking people's existing problems with their mental health. The long-term effects of flooding on psychological health may perhaps be even more important than illness or injury. For most people, the emotional trauma continues long after the water has receded. Making repairs, cleaning up, and dealing with insurance claims can also be stressful. If there is a lack of support during the recovery process, stress levels may increase further [2, 3].

What are hidden dangers of Floods?

Floods present many potential health hazards. Therefore, the emergency workers and other support staff should ensure that members of the public are aware of the potential risks when they return to their homes after a flooding event.

Animals and Insects-related hazards

During floods, snake bites are common and venomous snake bites can cause severe consequences. There is an important to have a knowledge of which species of venomous snakes present the greatest risks to human populations in any region or country is essential to addressing snake bite problems. Snake antivenoms are the only effective treatment to prevent or reverse most of the venomous effects of snake bites[8].

Regarding vector- borne diseases, especially mosquitoes can transmit infectious diseases. Increasing temperatures during or after floods and remaining standing water on the ground are also precipitating factors in growing up vectors. Health effects may be observed many weeks after the flood event. Early recognition of disease as well as thorough knowledge of the anticipated clinical manifestation in successive phases of disease is the basis for effective case management. Prompt notification of infections and their locations must be communicated to the emergency response unit to assist in detection and management of outbreaks [9].

Furthermore, there is some concern about diseases transmitted by rodents, which could increase during or after heavy rainfall and flooding because of altered patterns of contact. Leptospirosis is an example of such diseases. Most importantly, during periods of flooding, people should be encouraged to seek professional medical help if they are not feeling well. Generally, the control of commensal rodents prior to any event is very important [1].

Mould Hazards

After flooding, the excess moisture and standing water contribute to the growth of mould in homes and other buildings. When re-entering the flooded home, it should be aware that mould may be present and could pose a health risk of family. Therefore, the key to preventing mould growth is to clean up and dry out the house as quickly as possible.

Electrics Hazard

Electrical appliances have been in contact with floodwater. Therefore, these should not have been switched on unless a competent electrician has checked them, as there is a risk of electrocution.

Chemical Hazards

Floods and other disasters often cause chemical hazards like fuel, corrosive chemicals, industrial and agricultural chemicals to spill out of vehicles, industrial facilities, chemical storage places, fuel supplies and other sources. These can pose health hazards to the public, emergency service personnel and cleanup workers. Chemical spills resulting from environmental disasters can cause acute and long-term risks for and effects in humans [4].

What are the challenges during and aftermath Floods?

The medical community and the public health community should be prepared to address the needs of people who have been affected and those who may be affected by floods in future. The public should be cautioned against attempting to cross flooded roads in their vehicles and advised on how to prevent physical injury and exposures to flood waters or contaminated property during clean up. The public should boil or chlorinate tap water if their water company advises them to do so or if private supplies have been contaminated. Disease surveillance should be increased during floods, and information should be disseminated rapidly to dispel false rumours of contagion or outbreaks. Most importantly, those who provide medical care need to be aware of the increased medical and mental health needs of people who have experienced floods, which may continue for months and possibly years after the event [5].

Unsafe food

Pathogenic bacteria, dirt, oil, human and animal wastes, farm and industrial chemicals are seen in floodwater. Their contact with food items including food crops in agricultural lands during flooding can make that food unsafe to eat and hazardous to human health. Electric power failures caused by floods also damage stored food. Refrigerated and frozen foods are affected during the outage periods, and thus must be carefully monitored and examined prior to consumption. Food safety is particularly important for infants, pregnant women and elderly people, who are most susceptible to foodborne disease. Key behaviours surrounding safe food handling, preparation, hygiene and sanitation are the most important measures to protect individuals and families [6].

Contaminated drinking and washing water and poor sanitation

Flooding destroys the clean water sources with pollutants and devastates sanitary toilets. Direct and indirect contact with the contaminants, food intakes, vector or insects such as flies, unclean hands, or dirty plates and utensils that result in water-borne illnesses and life-threatening infectious diseases due to floods. The pollutants also saturate in the ground water and can infiltrate into sanitary sewer lines through the ground. In this situation, unclean drinking and washing water and sanitation, coupled with lack of adequate sewage treatment, can lead to disease outbreaks, e.g. life-threatening cholera, typhoid, dysentery and some forms of hepatitis as experienced in the floods. In an emergency, microbial drinking-water quality is the first concern. If the water of insufficient or uncertain microbial quality, it must be boiled when it is intended for drinking or food preparation. After boiling, the water should be allowed to cool down on its own without the addition of ice. If water cannot be boiled for all people, give priority to boiling drinking-water for

formula-fed infants, immunocompromised and other vulnerable clients[7].

Disease surveillance during and after flood events

Surveillance is the systematic collection, analysis, interpretation and dissemination of information for public health. As floods significantly affect the health of the public, robust surveillance is very important during and after flooding to identify and control the infectious disease outbreaks rapidly and the other health issues such as infectious disease, injuries, noncommunicable diseases to guide local and regional health service delivery and to add information about possible associations between floods and wellbeing.

CONCLUSION

The frequency of floods is increasing. The mortality relating to flooding is variable and depends on the enormity or otherwise of each extreme event and the capability of the rescue and recovery services. It is important that those who provide medical care need to be aware of the increased medical and mental health needs of the people who have experienced flooding. The medical community and the public health community should be prepared to address the needs of people who have been affected and those who may be affected by floods in future. Most importantly, those who provide medical care need to be aware of the increased medical and mental health needs of people who have experienced flooding, which may continue for months and possibly years after the event. There is also more to understand about the long-term consequences of flooding on health and about the mechanisms by which such consequences can best be prevented or alleviated.

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